

Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

Claims 1-37. (Canceled)

Claim 38. (New) A display element of the information screen or advertising panel type, comprising:

a plurality of juxtaposed electrochemical devices, each comprising at least one substrate (1,7), at least one electroconductive layer (2,6), at least one electrochemically active layer (3,5) that is capable of reversibly inserting ions, and an electrolyte (4), wherein the electrolyte (4) is a layer or a multilayer stack comprising at least one layer (4b) made of an ionically conductive material that is capable of reversibly inserting said ions but whose overall degree of oxidation is maintained essentially constant.

Claim 39. (New) The display element according to Claim 38, wherein said inserted ions are H^+ , Li^+ , Na^+ , Ag^+ or K^+ .

Claim 40. (New) The display element according to Claim 38, wherein the overall degree of oxidation of the layer (4b) of the electrolyte (4) is maintained essentially constant

by electrically insulating said layer (4b) from at least one of the electron sources of the device by interposing at least one layer (4a,4d) of an electronically insulating material.

Claim 41. (New) The display element according to Claim 40, wherein the layer(s) (4a,4d) made of electronically insulating material is ionically conductive/ion-permeable.

Claim 42. (New) The display element according to Claim 41, wherein the layer(s) (4a,4d) made of electronically insulating material forms part of the multilayer electrolyte (4) in direct contact with at least one of the faces of the layer (4b) having an overall degree of oxidation maintained essentially constant.

Claim 43. (New) The display element according to Claim 38, wherein the overall degree of oxidation of the layer (4b) of the electrolyte (4) is maintained essentially constant by keeping the potential of said layer (4b) at values outside the range of potentials causing a variation in the degree of ion insertion of the material of which it is composed.

Claim 44. (New) The display element according to Claim 38, wherein, in said device, in succession, an electroconductive layer (2), an electrochemically active layer (3) that is capable of reversibly inserting cations, the electrolyte (4) comprising layer (4b) made of ionically conductive material that is capable of reversibly inserting cations but whose overall degree of oxidation is maintained essentially constant, and optionally at least one

electronically insulating layer (4a,4c), a second electrochemically active layer (5) that is capable of reversibly inserting cations, and an electroconductive layer (6).

Claim 45. (New) The display element according to Claim 44, wherein said layer (3) is a cathodic electrochromic material and said layer (5) is of an anodic electrochromic material.

Claim 46. (New) The display element according to Claim 38, wherein the material of layer (4b) that is capable of reversibly inserting the ions but whose degree of oxidation is maintained essentially constant, is a material exhibiting an electrochromic property.

Claim 47. (New) The display element according to Claim 38, wherein the material exhibiting an electrochromic property of the layer (4b) is maintained in the decolored state or in an intermediate state of coloration.

Claim 48. (New) The display element according to Claim 38, wherein the electrochemical device operates by reversible insertion of protons from the an electrochemically active layer or layers (3,5) and in that the material of the layer (4b) of the electrolyte (4), which is capable of reversibly inserting protons, but whose degree of oxidation is maintained essentially constant, is based on a metal oxide or a mixture of metal oxides, optionally hydrated, and selected from the group consisting of tungsten oxide, optionally hydrated, $\text{WO}_3 \cdot n\text{H}_2\text{O}$, niobium oxide, optionally hydrated, $\text{Nb}_2\text{O}_5 \cdot n\text{H}_2\text{O}$,

optionally hydrated, $\text{NiO}_x \text{H}_y \cdot n\text{H}_2\text{O}$, tin oxide, optionally hydrated, $\text{SnO}_2 \cdot n\text{H}_2\text{O}$, bismuth oxide, optionally hydrated, $\text{Bi}_2\text{O}_3 \cdot n\text{H}_2\text{O}$, titanium oxide, optionally hydrated, $\text{TiO}_2 \cdot n\text{H}_2\text{O}$, vanadium oxide, optionally hydrated, $\text{V}_2\text{O}_5 \cdot n\text{H}_2\text{O}$, molybdenum oxide, optionally hydrated, $\text{MoO}_3 \cdot n\text{H}_2\text{O}$, where $n \geq 0$ and optionally comprising an additive metal, which can be hydrated, of titanium, tantalum, rhenium, or of an alkali metal.

Claim 49. (New) The display element according to Claim 38, wherein the electrochemical device operates by reversible insertion of lithium ions Li^+ from the an electrochemically active layer or layers (3,5), the material of said layer (4b) of the electrolyte (4), which is capable of reversibly inserting lithium ions Li^+ , but whose degree of oxidation is maintained essentially constant, being based on a metal oxide or a mixture of metal oxides, which optionally are lithiated and are selected from the group consisting of nickel oxide NiO_x , lithiated nickel oxide Li_yNiO_x , a mixture of titanium and cerium oxides CeTiO_x , tungsten oxide WO_3 , niobium oxide Nb_2O_5 , vanadium oxide V_2O_5 and lithiated oxide vanadium oxide $\text{Li}_x\text{V}_2\text{O}_5$.

Claim 50. (New) The display element according to Claim 40, wherein the layer or layers (4a,4d) of electronically insulating material comprises at least one oxide of a metal of column VB of the Periodic Table and at least one metal oxide selected from the group consisting of antimony oxide Sb_2O_5 , zirconium oxide ZrO_2 , titanium oxide TiO_2 , silicon oxide SiO_2 , chromium oxide CrO_3 , these oxides being optionally hydrated and optionally comprising a hydratable metal additive of W, Re or an alkali metal.

Claim 51. (New) The display element according to Claim 50, wherein said metal oxide is a mixed Ta-Ti oxide, GeO_3 or $\text{ZnO}(\text{H}_3\text{PO}_4)_2 \cdot \text{H}_2\text{O}$.

Claim 52. (New) The display element according to Claim 40, wherein the layers (4a,4c) of electronically insulating material is formed of CeF_3 , hexa-uranylphosphate HUP, MgF_2 , CaF_2 , SiO_x , LiF , Na_3AlF_6 or based on Li_3N , LiTaO_3 , LiAlF_4 , Li_3PO_4 , LiPO_2 , LiN , LiNbO_3 , MgF_2POLi or Li_2WO_4 , said device operating by reversible insertion of lithium ions from the electrochemically active layer or layers (3,5).

Claim 53. (New) The display element according to Claim 38, wherein the materials which form layer (4b) are capable of reversibly inserting the ions but whose degree of oxidation is maintained essentially constant and/or materials forming the layers (4a,4d) made of electronically insulating material are nitrated and/or phosphatized.

Claim 54. (New) The display element according to Claim 40, wherein the layers (4a,4d) made of electronically insulating material is a material whose electrical insulation properties are obtained by blocking its ability to insert ions by controlling its potential.

Claim 55. (New) The display element according to Claim 38, wherein the multilayer electrolyte (4) comprises a layer made of an ionically conductive material (4c) in the form of an aqueous liquid or of an anhydrous liquid or based on polymer(s) or on a gel(s).

Claim 56. (New) The display element according to Claim 38, wherein the electrochemically active layers (3,5) comprise a layer (5) of cathodic electrochromic material selected from the group consisting of and in that the material of the layer (4b) of the electrolyte (4), which is capable of reversibly inserting protons, but whose degree of oxidation is maintained essentially constant, is based on a metal oxide or a mixture of metal oxides, optionally hydrated, and selected from the group consisting of tungsten oxide WO_3 , molybdenum oxide MoO_3 , vanadium oxide V_2O_5 , niobium oxide Nb_2O_5 , titanium oxide TiO_2 , a cermet material of the WO_3/Au or WO_3/Ag type, a mixture of tungsten and rhenium oxides WO_3/ReO_3 , and phosphotungstic acid, metallophthalocyanines or metallodibenzophthalocyanines of transition metals or of rare earths, optionally nitrided.

Claim 57. (New) The display element according to Claim 38, wherein the electrochemically active layers comprise a layer (3) of anodic electrochromic material in the form $\text{M}_x\text{A}_y\text{U}_z$, where M is a transition metal, A is the ion used for the reversible insertion, and U is a chalcogenide, which is optionally nitrided.

Claim 58. (New) The display element according to Claim 57, wherein the chalcogenide is S, O or Se.

Claim 59. (New) The display element according to Claim 38, wherein the electrochemically active layers comprise a layer (3) of anodic electrochromic material which,

in the case of the reversible insertion of protons, is selected from the group consisting of LiNiO_x , IrO_xH_y , $\text{IrO}_x\text{H}_y\text{N}_z$, NiO_x , NiO_xH_y , $\text{NiO}_x\text{H}_y\text{N}_z$, RhO_x , CoO_x , CrO_x , MnO_x , and a hydride of a rare earth, of a lanthanide or of transition metals and, in the case of reversible insertion of lithium ions Li^+ selected from the group consisting of LiNO_x , LiMn_2O_4 , IrO_x , Li_xIrO_y , NiO_x , CeO_x , TiO_x , $\text{CeO}_x\text{-TiO}_x$, RhO_x , CoO_x , CrO_x , MnO_x , VO_x , Li_xCoO_y , LiCrO_y , LiVO_y , ReO_x , RhO_x , PtO_x , FeO_x , OsO_y , CuO_x , PrO_x , these compounds being optionally lithiated and/or nitrated and, in the case of insertion of protons or of Li^+ or of hexacyanometalates, of formula $\text{M}[\text{M}'(\text{CN})_6]$, with M and M' being transition metals and/or rare earths.

Claim 60. (New) The display element according to Claim 38, wherein at least one of the electroconductive layers (2,6) comprises at least one doped metal oxide selected from the group consisting of ITO or $\text{SnO}_2\text{:F}$, or a metal or a metal alloy selected from the group consisting of gold, silver, aluminum or Ni-Cr alloy or is the superposition of several layers of these materials.

Claim 61. (New) The display element according to Claim 38, wherein the multilayer electrolyte (4) and all of the layers of the said device contain only layers of solid material.

Claim 62. (New) The display element according to Claim 38, wherein the multilayer electrolyte comprises a layer made of an electric insulator in the form of a gel or a polymer.

Claim 63. (New) The display element according to Claim 38, wherein the multilayer electrolyte is $(\text{NiO}_x\text{H}_y \cdot n \text{H}_2\text{O}/\text{WO}_3 \cdot n \text{H}_2\text{O})_n$, with $n \geq 1$.

Claim 64. (New) The display element according to Claim 38, wherein the multilayer electrolyte is $(\text{NiO}_x\text{H}_y \cdot n \text{H}_2\text{O}/\text{WO}_3 \cdot n \text{H}_2\text{O})_p$ or $(\text{Ta}_2\text{O}_5 \cdot n \text{H}_2\text{O}/\text{WO}_3 \cdot n \text{H}_2\text{O})_p$ with $n \geq 2$.

Claim 65. (New) The display element according to Claim 38, wherein at least a substrate is a plastic substrate.

Claim 66. (New) The display element according to Claim 38, wherein at least a substrate is a thin flexible plastic sheet.